CLAIMS

What is claimed is:

1. A method of using a vector network analyzer (VNA) for coordinated Voltage Standing-Wave Ratio (VSWR) and Time Domain Reflectometry (TDR) measurement, said method comprising configuring said VNA for identifying discontinuities correlated to a VSWR lobe.

2. The method of claim 1 additionally comprising:

identifying a largest VSWR lobe in the frequency band of interest;

using phase data associated with S_{11} scattering parameter to find the correct electrical delay required to align Low Pass Step Transform data; and

configuring said Low Pass Step Transform span and center time to align coherent inductive and capacitive discontinuities relative to grid lines of a TDR display.

3. The method of claim 2 additionally comprising:

setting a first channel to Low Pass Step Transform and a second channel to a scattering parameter S_{11};

finding f_0, the frequency at the peak amplitude of the largest lobe of said scattering parameter S_{11} in the frequency band of interest;

setting electrical delay to zero;

finding the phase of S_{11} at f_0;

denoting said phase θ (degrees);

setting electrical delay in said first and said second channels to $(90-\theta)/(360 * f_0)$, such that said S_{11} lobe phase reads 90 degrees;

setting said first channel span to $10/ f_0$;

setting said first channel center to 0.4*span; and

setting said first channel format to real.

4. The method of claim 3 additionally comprising:

ensuring a valid 1-port calibration is performed on said VNA;

setting said first channel reference position to five divisions;

setting said first channel reference value to zero; and

setting said first channel scale to 0.05 units per division.

5. The method of claim 2 additionally comprising repeating said method for any additional problem VSWR lobes in said frequency band of interest, in order of decreasing lobe magnitude.

6. The method of claim 2 further comprising calibrating the magnitudes of capacitive, inductive, and resistive discontinuities, thereby allowing the design of correctly sized compensating features.

7. The method of claim 3 wherein said method is performed manually.

8. The method of claim 3 wherein said method is performed automatically.

9. The method of claim 8 additionally comprising:

providing a suitable VNA;

placing by a user a user-scrollable display marker on a VSWR or S_{11} lobe of interest;

pressing a control key by said user, thereby initiating automated execution of said method; and

automatically displaying a Low Pass Step Transform with correct time alignment for identifying coherent, canceling, and orthogonal circuit discontinuities.

10. The method of claim 9 wherein said suitable VNA comprises:

a visual display;

a processor operable to process time domain and frequency domain reflection signals for graphic presentation on said visual display, said processor capable of performing VNA state control and vector mathematical operations: and

wherein said display includes a visual display marker having a recognizable shape.

11. The method of claim 6, wherein said method is performed automatically.

12. The method of claim 11 additionally comprising:

providing a suitable VNA; and

calculating the relationship of discontinuity amplitude to excess capacitance and/or excess inductance using a processor associated with said VNA.

13. The method of claim 12 additionally comprising placing a user-scrollable display marker on a time-domain discontinuity;

14. The method of claim 12 additionally comprising accepting at a user interface of said VNA y-axis scaling unit inputs of pF per division and/or nH per division.

15. The method of claim 12 additionally comprising selecting via a calibration enunciator of a TDR display of said VNA a scale in pF per division and/or nH per division in response to user interface entry of units per division.

16. A system for concurrent frequency and time domain reflectometry measurements of an electromagnetic device, said system comprising:

a vector network analyzer (VNA) providing a visual display and a user interface; and

a processor associated with said VNA, said processor operable to process said signal for graphic presentation on said visual display.

17. The system of claim 16 wherein said display comprises a user-scrollable visual display marker having a recognizable shape.

18. The system of claim 16 further comprising a coaxial cable and an RF connector for communicatively coupling a signal from said electromagnetic device to said VNA.

19. The system of claim 16 wherein said processor is capable of performing VNA state control and vector mathematical operations.

20. The system of claim 16 wherein said processor is internal to said VNA.

21. The system of claim 16 further comprising an algorithm that generates a visual display of desired coherent, canceling, and orthogonal electromagnetic reflection discontinuities in response to said concurrent time and frequency domain reflectometry measurements.